

## CLAIMS

We claim:

1. A centrifugal separation system comprising:

fluid delivery means powered by a motor for providing a  
5 cylindrical vortex fluid flow;

a separation chamber for containing said fluid flow; and

a collector for collecting matter, coupled to said  
separation chamber by a transfer slot;

wherein said fluid flow centrifugally ejects said matter  
10 therefrom into said separation chamber, and further wherein said  
transfer slot effects circulation of said matter and said fluid  
flow within said collector.

2. A centrifugal separation system according to claim 1 wherein  
15 said fluid delivery means is powered by an electrical motor.

3. A centrifugal separation system according to claim 1 wherein  
said fluid delivery means is powered by a combustion motor.

20 4. A centrifugal separation system according to claim 1 wherein  
said motor is powered by compressed gas.

5. A centrifugal separation system according to claim 1 wherein said fluid delivery means is powered by a motor that is powered by a flowing fluid.

5 6. A centrifugal separation system according to claim 1 wherein said separation chamber is cylindrical.

7. A centrifugal separation system according to claim 1 wherein said fluid delivery means comprises an impeller assembly.

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8. A centrifugal separation system according to claim 1 wherein said fluid delivery means comprises a centrifugal pump.

9. A centrifugal separation system according to claim 1,  
15 wherein said collector and said separation chamber are configured such that a pressure is developed in said collector that is greater than the pressure in said separation chamber.

10. A centrifugal separation system according to claim 1,  
20 wherein said matter is selected from the group consisting of dust, leaves, twigs, pebbles, nails, screws, nuts, dirt, and sand.

11. A centrifugal separation system according to claim 1  
further comprising an inner tube and an outer tube, said inner  
tube and said outer tube being coaxial and coupled to said  
separation chamber, wherein the gap between said inner tube and  
5 said outer tube forms an annular duct.

12. A centrifugal separation system according to claim 1  
wherein said collector is made of a flexible material.

10 13. A centrifugal separation system according to claim 1  
wherein said collector is disposable.

14. A centrifugal separation system according to claim 1  
wherein said collector is a garbage bag.

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15. A centrifugal separation system according to claim 1  
wherein said collector is removable.

16. A centrifugal separation system according to claim 1  
20 wherein said circulation within said collector substantially  
prevents said matter from escaping said collector.

17. A centrifugal separation system comprising:  
fluid delivery means for providing a fluid flow;

a separation chamber for separating matter from said fluid flow;

a collector for collecting said separated matter, coupled to said separation chamber by a transfer slot;

5        an inner tube and an outer tube, said inner tube and said outer tube forming an annular duct, said annular duct ending in a toroidal vortex nozzle.

18.    A centrifugal separation system according to claim 17  
10    wherein said fluid delivery means comprises flow straightening vanes.

19.    A centrifugal separation system according to claim 17  
      wherein said transfer slot effects circulation of said matter  
15    and said fluid within said collector.

20.    A centrifugal separation system according to claim 17  
      wherein said collector is removable.

20    21.    A centrifugal separation system according to claim 17  
      wherein said collector further comprises means for emptying the contents of said collector.

22. A centrifugal separation system according to claim 17 wherein said collector further comprises a door.

23. A centrifugal separation system according to claim 17  
5 wherein said collector further comprises a removable stopper.

24. A centrifugal separation system according to claim 17 wherein said fluid delivery means comprise a centrifugal pump.

10 25. A centrifugal separation system according to claim 17 wherein said collector is made of a flexible material.

26. A centrifugal separation system according to claim 17 wherein said collector is disposable.

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27. A centrifugal separation system according to claim 17 wherein said collector is a garbage bag.

28. A centrifugal separation system according to claim 17  
20 wherein said collector is removable.

29. A centrifugal separation system according to claim 17 wherein said circulation within said collector substantially prevents said matter from escaping said collector.

30. A centrifugal separation system comprising:

fluid delivery means for providing a fluid flow;

a separation chamber for separating from said fluid flow;

5 a collector for collecting said matter;

an opening in the wall of said separation chamber, said opening leading into said collector, said opening effecting fluid flow and matter flow within said collector;

an outer tube coupled to said separation chamber; and

10 an inner tube located inside said outer tube, said inner tube and said outer tube being coaxial, wherein the gap between said inner tube and said outer tube forms an annular duct.

31. A centrifugal separation system according to claim 30

15 wherein said fluid delivery means is powered by a motor.

32. A centrifugal separation system according to claim 30

wherein said fluid delivery means is powered by an electrical motor.

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33. A centrifugal separation system according to claim 30

wherein said fluid delivery means is powered by a combustion motor.

34. A centrifugal separation system according to claim 30 wherein said fluid delivery means is powered by a motor that is powered by a compressed gas.

5 35. A centrifugal separation system according to claim 30 wherein said fluid delivery means is powered by a motor that is powered by a flowing fluid.

36. A centrifugal separation system according to claim 30  
10 wherein said separation chamber is cylindrical.

37. A centrifugal separation system according to claim 30 wherein said fluid delivery means comprises an impeller assembly.

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38. A centrifugal separation system according to claim 30 wherein said fluid delivery means comprises a centrifugal pump.

39. A centrifugal separation system according to claim 30, wherein said collector and said separation chamber are configured such that a pressure is developed in said collector that is greater than the pressure in said separation chamber.

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40. A centrifugal separation system according to claim 30, wherein said matter is selected from the group consisting of dust, leaves, twigs, pebbles, nails, screws, nuts, dirt, and sand.

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41. A centrifugal separation system according to claim 30 wherein said collector is made of a flexible material.

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42. A centrifugal separation system according to claim 30 wherein said collector is disposable.

43. A centrifugal separation system according to claim 30 wherein said collector is a garbage bag.

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44. A centrifugal separation system according to claim 30 wherein said collector is removable.

45. A centrifugal separation system according to claim 30 wherein said matter flow and said fluid flow within said



collector substantially prevents said matter from escaping said collector.

46. A centrifugal separation system according to claim 30  
5 wherein said inner and outer tubes end in a toroidal vortex nozzle.

47. A centrifugal separation system according to claim 30  
further comprising flow straightening vanes disposed in said  
10 annular duct.

48. A centrifugal separation system according to claim 30  
wherein said collector is removable.

15 49. A centrifugal separation system according to claim 30  
further comprising means for emptying the contents of said collector.

50. A centrifugal separation system according to claim 30  
20 wherein said collector further comprises a door for emptying the contents of said collector.

51. A centrifugal separation system according to claim 30  
wherein said collector further comprises a removable stopper.

52. A method of centrifugally separating matter from a fluid comprising the steps of:

utilizing a motor to provide a cylindrical vortex fluid flow within a separation chamber;

5 centrifugally ejecting said matter into a collector; and

maintaining a fluid flow and matter flow within said collector, wherein said fluid flow and said matter flow within said collector substantially prevent the escape of said matter from said collector into said separation chamber.

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53. A method according to claim 52 wherein said fluid flow is delivered to said separation chamber via an inner tube coupled thereto.

15 54. A method according to claim 52 wherein said fluid flow exits said separation chamber via an annular duct created between an inner tube and an outer tube, wherein said inner tube delivers said fluid flow to said separation chamber, and wherein said inner tube and said outer tube are coaxial.

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55. A method according to claim 52 further comprising the step of creating a higher pressure in said collector than in said separation chamber such that said cylindrical vortex fluid flow is maintained without impeding said matter from carrying into  
5 said collector.

56. A method according to claim 52, wherein a toroidal vortex nozzle is located at the distal end of said inner tube and said outer tube.

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57. A method according to claim 52 wherein an impeller coupled to said motor provides said cylindrical vortex fluid flow.

58. A method according to claim 52 wherein a said motor is  
15 coupled to a centrifugal pump which provides said cylindrical vortex fluid flow.